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PATENT ABSTRACTS OF JAPAN

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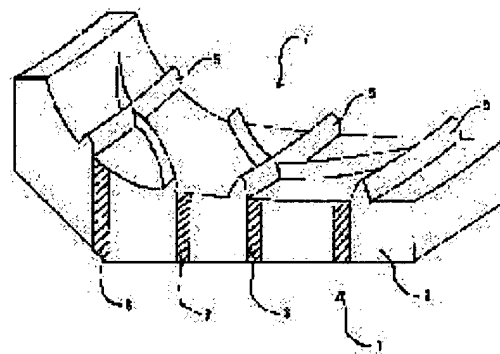
(72)Inventor : FURUKAWA HIROSHI

(54) TIRE MOLDING DIE

(57)Abstract:

PROBLEM TO BE SOLVED: To vent air efficiently while controlling accumulation of soils of a rubber or the like to the low frequency, carry out the maintenance simply, and not damage the outer appearance of a tire.

SOLUTION: A tread pattern is formed on a product tire and at least one air vent slit 3 is formed between the adjoining faces of a plurality of pieces 1 forming the annular shape as a whole, the width of an opening of the slit 3 is 10 μ m to 200 μ m, and the width of the slit 3 is formed larger starting from the point being moved forward by 0.3 to 5.0 mm from the opening of the slit 3 having the length of total 1 mm or longer.



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CLAIMS

[Claim(s)]

[Claim 1] In the tire molding die equipped with two or more piece which gives a tread pattern to a product tire and which makes annular as a whole, and the holder which can adjoin and equip a hoop direction with these piece The shaping side where said piece gives some tread patterns, and said other piece and the contact surface which contacts or approaches, Have said holder and the tooth back which contacts or approaches, and it has the slit of at least one air vent between the contact surfaces between said piece. The tire molding die characterized by for the width of face of opening of the slit being 10 micrometers thru/or 200 micrometers, and the sum total of the die length of opening of the slit being 1mm or more.

[Claim 2] The tire molding die according to claim 1 to which it was made for the width of face of 0.3 thru/or the point which progressed 5.0mm to the slit to become large from opening of said slit.

[Claim 3] The tire molding die according to claim 1 or 2 which said two or more slits open for free passage mutually from opening of this slit at 0.3 thru/or the point which progressed 5.0mm.

[Claim 4] The tire molding die according to claim 1 to 3 whose field roughness of the wall of said slit is less than [RMAX 10micrometer].

[Claim 5] The tire molding die according to claim 1 to 4 which comes to form the end of at least one slit in a heights root edge among said slits.

[Claim 6] The tire molding die according to claim 1 to 5 to which said piece changes from an iron system alloy or a copper system alloy.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a tire molding die, and relates to the tire molding die which is excellent in continuous-molding nature and maintenance nature, has close dimensional accuracy, and can fabricate the good tire of an appearance further.

[0002]

[Description of the Prior Art] As a conventional tire molding die, the metal mold of a vertical division format as shown in drawing 11, and the metal mold of the division format to the direction of a path as shown in drawing 12 were known, and in such metal mold, in order to discharge gas, such as air confined between metal mold and an unvulcanized rubber at the time of tire vulcanization shaping, to the exterior of metal mold, many stomata which are open for free passage within and without [which is called a vent hole] metal mold were drilled. However, since there is much drilling number, as a result of the activity which drills this vent hole taking skill, and a man day's also increasing moreover, there was a problem that the manufacture effectiveness of metal mold was not enough. Moreover, since the rubber of a pilliform called a spew by the vent hole on the fabricated tire front face occurred, this had to be removed, even if removed, a trace tended to remain on a tire front face, and there was a problem that this trace spoiled the appearance of a tire or spoiled the initial transit property of a tire. Furthermore, if shaping of a tire is repeated using the metal mold like ****, when the above-mentioned spew is cut, it remains in a vent hole or the dirt for rubber etc. accumulates, a vent hole may be got blocked, consequently the air-bleeder effectiveness will fall, and the fault called crater-like raise in basic wages to a tire front face will be generated. It is always necessary for this reason, to remove the foreign matter in a vent hole and to change into a penetration condition. Moreover, since a metal mold front face became dirty with polymer carbon and other mineral matter, metal mold needed to be washed periodically, and after this washing had to perform ***** of a foreign matter manually using the drill etc. per all vent holes, and had the problem that the maintenance of metal mold was complicated.

[0003] As opposed to such a problem to JP,4-223108,A and JP,5-220753,A Divide into two or more piece 1 the tread shaping section 13 which gives a tread pattern to a tire using the tire molding die of segment format as shown in drawing 12, and it holds with a holder 15. By preparing the clearance for extracting air at the same time it controls contiguity spacing of each piece appropriately in the case of a setup of tooling and prevents discharge for rubber It is also indicated that it can be applied also to metal mold as shown in drawing 11 that that the number of vent holes can be reduced or lost divides . currently indicated and piece 1, and it prepares the clearance between the above-mentioned air vents. However, it also sets to the metal mold which divides the above piece and carries out contiguity arrangement. If a tire is fabricated several 100- thousands times, since a metal mold front face will be harmed for the appearance of dirt and the tire obtained, or dirt, such as rubber, will accumulate on the clearance between the air-bleeders between a vent hole and piece and raise in basic wages will occur like the usual tire molding die It is necessary to wash metal mold periodically for every shaping hundreds - thousands times. In the above-mentioned piece part sprit mold, this washing that removes the dirt for the rubber which entered the clearance between air vents etc. removes each piece from a holder, and is performed by blasting washing which sprays fine particles, such as a glass bead and iron powder, on each piece. Some metal mold of segment format as shown in drawing 13 is shown in the . said drawing which is a perspective view in which drawing 13 shows an example of a tire molding die partially, a holder 15 is equipped with two or more piece 1, and it constitutes the segment 19. Piece 1 forms the tread pattern of the whole tire with all piece, and the convex pattern (a bony septum and blade section) for fabricating a tread pattern into a tire is formed in the shaping side 7 (not shown).

[0004]

[Problem(s) to be Solved by the Invention] Although plugging of the vent hole by the spew piece could also be prevented while the metal mold which divides into piece and carries out contiguity arrangement could prevent generating of a spew compared with the conventional tire molding die, deposition of dirt, such as rubber between piece, did not decrease, but had the problem that each piece had to be frequently taken into pieces and blasting washing had to be performed. This invention is made against the background of this situation, an effective air vent can be performed, the place made into the purpose can perform maintenance easily, suppressing deposition of dirt, such as rubber, in low frequency, and it is in offering further the tire molding die which does not spoil the appearance of a tire.

[0005]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, among this inventions invention according to claim 1 In the tire molding die equipped with two or more piece which gives a tread pattern to a product tire and which makes annular as a whole, and the holder which can adjoin and equip a hoop direction with these piece The shaping side where said piece gives some tread patterns, and said other piece and the contact surface which contacts or approaches, It is characterized by having said holder and the tooth back which contacts or approaches, having the slit of at least one air vent between the contact surfaces between said piece, for the width of face of opening of the slit being 10 micrometers thru/or 200 micrometers, and the sum total of the die length of opening of the slit being 1mm or more. Since the flash height of the rubber at the time of tire shaping will become large and the appearance of a product tire will be spoiled if width of face of opening of a slit cannot miss air easily effectively in 10 micrometers or less and the width of face of opening of a slit exceeds 200 micrometers, it is not desirable. Unless the sum total of the die length of opening of a slit has at least 1mm or more, air cannot be missed effectively. Furthermore, it can be made open for free passage mutually [the slit of said plurality] at 0.3 from opening of this slit thru/or the point which progressed 5.0mm like invention according to claim 3 in enlarging width of face of 0.3 from opening of said slit thru/or the point which progressed 5.0mm to the slit like invention according to claim 2, in order to miss air effectively and to lower the ventilation resistance in a slit.

[0006] a prevention of dirt, such as rubber generated to a slit on the other hand, sake -- invention according to claim 4 -- it is desirable that the field roughness of the wall of said slit considers as less than [RMAX 10micrometer], and it is [like] more desirable to be referred to as 3 micrometers or less. Moreover, the thing of said slit for which an end is formed in the root edge of heights (bony septum) at least is desirable like invention according to claim 5. Gas, such as air, is made easy to escape from by preparing a slit in the part in the blockaded field (henceforth a lock out block) which was divided by heights, since the flow of gas, such as air, tended to collect on the root of heights. Here, heights mean the bony septum for fabricating a tread pattern into a tire. Moreover, said piece consists of an iron system alloy or a copper system alloy like invention according to claim 6. Since reactivity with a rubber component is small, an iron system alloy is desirable, and if the fluidity and reinforcement of a ***** sake are taken into consideration for a shaping side to a precision also among iron system alloys, especially spheroidal-graphite-cast-iron or carbon steel steel-casting ** is desirable. Moreover, since there is reactivity with a rubber component, when using this alloy, it is desirable, although a BeCu alloy (Cu alloy which contains 1.0 - 3.0% of the weight of Be and 0.3 - 1.0% of the weight of Co especially) excels in fluidity, a degree of hardness, and thermal conductivity and is good as a copper system alloy to perform nickel and/or Cr plating to an alloy front face. In addition, although it is desirable to consider as the presentation of S40C which contained the carbon content 0.4 to 0.6% of the weight - S55C if improvement in fluidity (reduction in the melting point) and a degree of hardness is taken into consideration when using carbon steel steel casting, it is much more desirable to use the thing which made improvement components in hardenability, such as nickel, Cr, and Mo, contain further.

[0007]

[Embodiment of the Invention] Hereafter, an example of the gestalt of operation of this invention is explained based on a drawing. The perspective view in which drawing 1 and drawing 2 show the gestalt of the operation of piece from which slit opening die length differed respectively in each drawing, The perspective view showing the gestalt of the operation to which drawing 3 and drawing 4 enlarged slit die length by the side of the tooth back of slit opening division manager halfbeak piece, The partial perspective view in which the perspective view, drawing 6 , and drawing 7 which show the gestalt of the operation with which drawing 5 connected two or more slits show the physical relationship of a slit edge and an epiphyseal area, Drawing showing the formation location of the slit which saw drawing 8 and drawing 9 from the shaping side, and drawing 10 are the sectional views showing the gestalt of the operation which made width of face of the slit by the side of the tooth back of piece larger than the width of face of slit opening. Drawing 1 and drawing 2 show the perspective view showing the gestalt of the operation of piece from which slit opening die length differed respectively. In drawing 1 , the width of face of opening of a slit is 20 micrometers, the die length of opening of the slit set to 5mm, in drawing 2 , the width of face of opening of a slit is 20 micrometers, and the die length of opening of the

slit was carried out to from heights to heights. In this case, since ventilation resistance is decided by area of opening of a slit, the direction which enlarged the die length of opening of a slit and made width of face of opening of a slit small can make the height of a spew small, and is advantageous. However, plugging according that the width of face of opening of a slit is 10 micrometers or less to deposition of dirt, such as rubber, becomes early. Moreover, it goes out, in case the flash rubber which invaded into the slit is mold release, and it becomes easy to remain, and blinding may be started. Moreover, if the width of face of opening of a slit exceeds 200 micrometers, the flash height of the rubber component at the time of tire shaping will become large, and will spoil the appearance of a product tire. The die length of opening of a slit has 5 desirablenmm or more from a viewpoint of ventilation resistance. In addition, as for a slit, it is desirable to be arranged at at least one part which forms the lock out block in the tread section of a product tire.

[0008] Drawing 3 is the perspective view showing the gestalt of the operation which enlarged slit die length by the side of the tooth back of slit opening division manager halfbeak piece. Ventilation resistance can be lowered by enlarging slit die length. The width of face of opening of a slit was 20 micrometers, and the die length of opening of the slit was set to 5mm, and set the die length of a slit to 15mm from the part with a depth [opening of a slit to] of 2.0mm. in addition, it is shown in drawing 3 -- as -- slit die length -- being discontinuous (with a stage) -- it is also possible to enlarge slit die length continuously besides enlarging, as shown in drawing 4 . If a depth dimension is made smaller than 0.3mm, flash rubber height exceeds this, and it remains [a lifting and the rubber which went out] a rubber piece in a slit and is not desirable as a result.

[0009] Drawing 10 (b) is the sectional view showing the gestalt of the operation which made width of face of the slit by the side of the tooth back of piece larger than the width of face of slit opening. Ventilation resistance can be lowered by enlarging slit width. In addition, drawing 10 (a) is a sectional view when the width of face of slit opening is uniform.

[0010] Drawing 5 is the perspective view showing the gestalt of the operation which connected two or more slits. The width of face of opening of a slit is 20 micrometers, and the die length of opening of the slit was set to 5mm, and was made to open for free passage with other slits from opening of a slit in a part with a depth of 2.0mm. By making between slits open for free passage, ventilation resistance is lowered and the air of the part which an accumulator ball tends to generate can be eliminated efficiently.

[0011] Drawing 6 and drawing 7 are the partial perspective views showing the physical relationship of a slit edge and an epiphyseal area. Drawing 6 shows the piece which comes to form the end of a slit in a heights root edge, and drawing 7 shows the piece with which the end of a slit went into inside a little from the heights root edge. The piece shown in drawing 7 is easier for processing. Although the inclination which an accumulator ball tends to generate in a lock out block, especially the bone root section was suited conventionally, it becomes possible by applying the slit of the gestalt of this operation to prevent generating of an accumulator ball.

[0012] Drawing 8 and drawing 9 are drawings showing the formation location of the slit seen from the shaping side. In drawing 8 , opening of a slit was formed by forming a slot in one contact surface of adjoining piece by forming opening of a slit and forming a slot in both adjoining piece in drawing 9 . All can be chosen if a predetermined opening aspect product is securable. Drawing 8 of a processing side is more desirable few.

[0013] In addition, the ingredient of the above-mentioned piece was used as the iron system alloy or the copper system alloy. Moreover, processing of a slit was performed by machining. However, well-known techniques, such as blasting, etching, and an electron discharge method, are applicable suitably.

[0014] In this invention, surface roughness of a slit was taken as RMAX 10micrometer. Although a part for Fe was detected from the dirt extracted from the conventional metal mold (surface roughness is generally 20-30 micrometers) as a result of performing tire shaping and carrying out component analysis of dirt, such as deposited rubber, a part for Fe was not detected from the example of a gestalt of operation of this invention. While being hard coming to deposit dirt by making field roughness small, it is shown that dirt is easily removable.

[0015]

[Effect of the Invention] This invention is very useful, in order according to this invention to be able to perform an effective air vent, to be able to perform maintenance easily and not to spoil the appearance of a tire further, suppressing deposition of dirt, such as rubber, in low frequency as more than explained.

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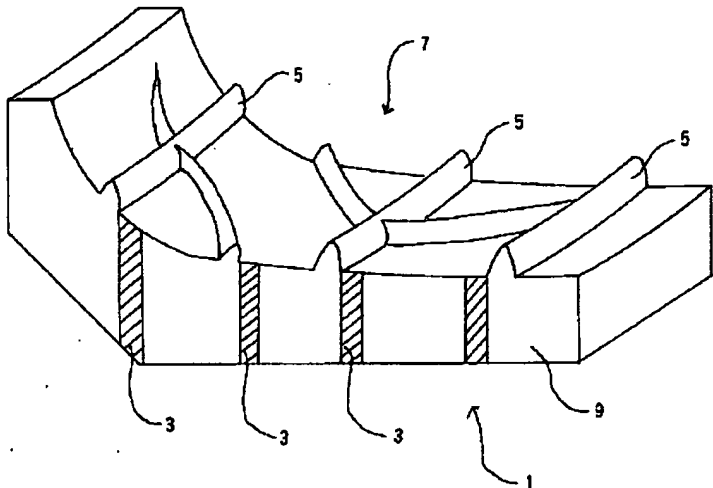
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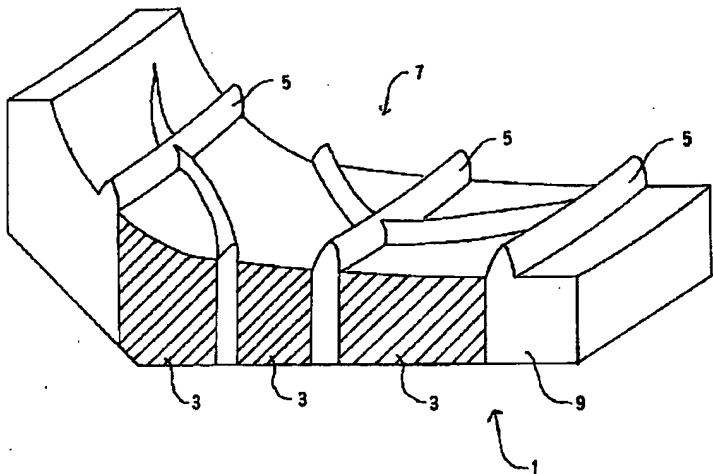
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DRAWINGS

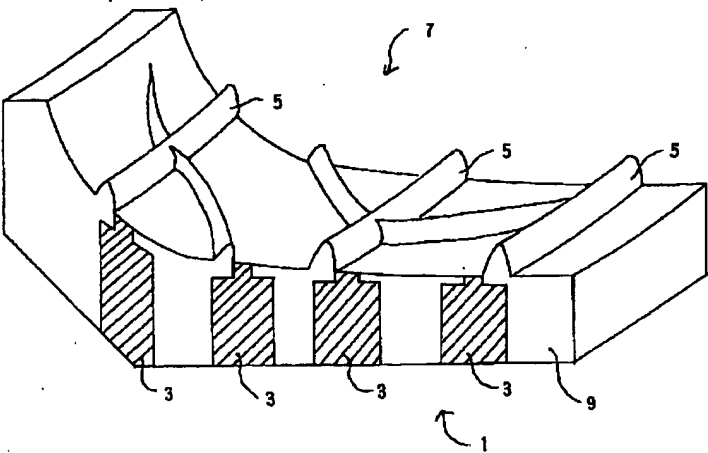
[Drawing 1]



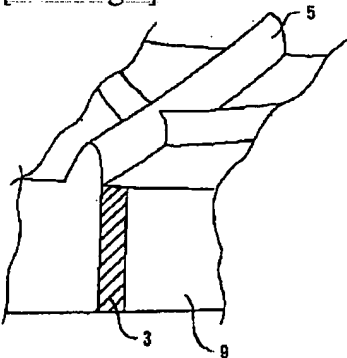
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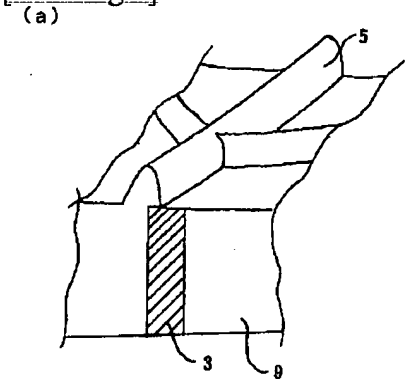
[Drawing 3]



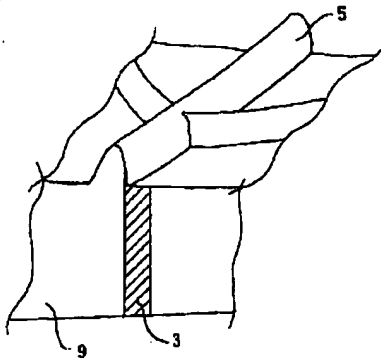
[Drawing 6]



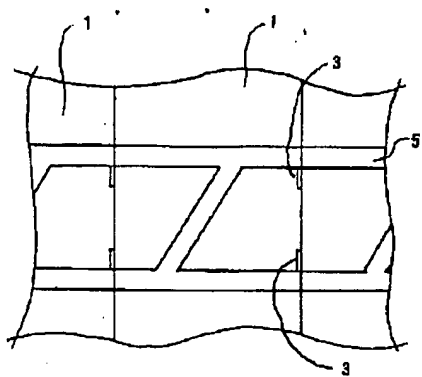
[Drawing 7]



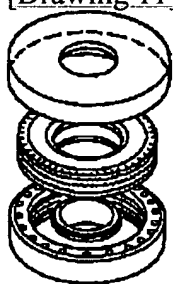
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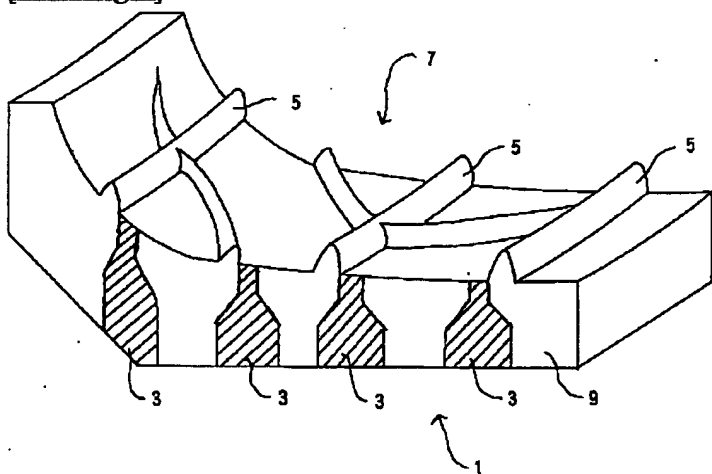
[Drawing 8]



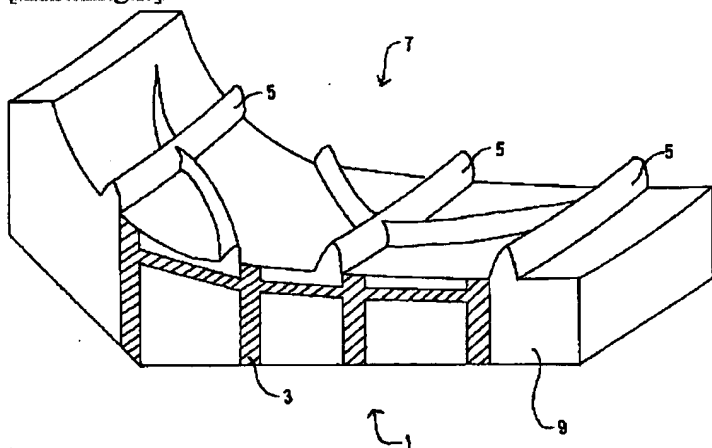
[Drawing 11]



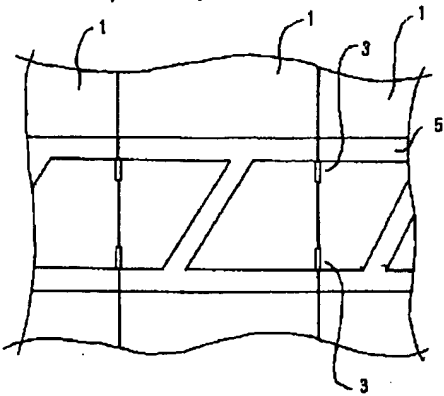
[Drawing 4]



[Drawing 5]

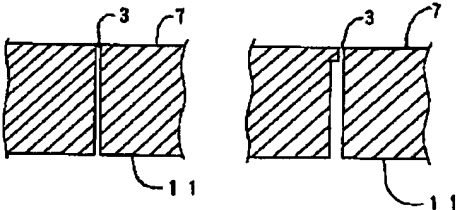


[Drawing 9]

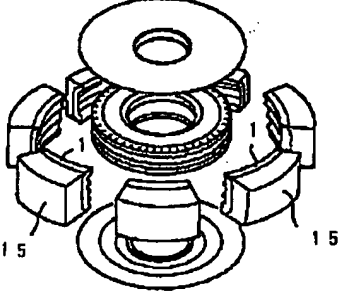


[Drawing 10]

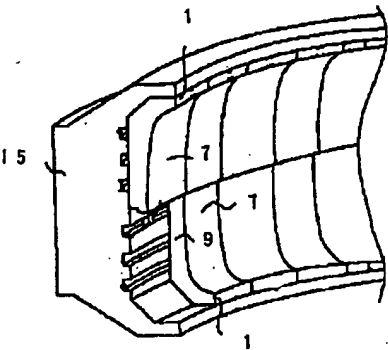
(a) (b)



[Drawing 12]



[Drawing 13]



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PA - (NIGA) NGK INSULATORS LTD

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PR - JP19970069388 19970324

XA - C1998-176435

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AB - J10264169 A tyre mould has circular pieces (1) to give a tread pattern to the product tyre, and holders (15) on which the pieces (1) can be mounted adjacently in the circumferential direction. The piece (1) has a moulding surface (7) to give a part of the tread pattern, an adjacent surface (9) to make contact with the other piece (1), and a back surface (11) to make contact with the holder (15). At least, one slit (3) for air vent is provided between the adjacent surfaces (9) of the pieces (1). The width of the opening part of the slit (3) is 10 to 200 micrometers, and the total of the length of the opening part is 1 mm or over.

- USE - Used to form tyres.

- ADVANTAGE - Effective air venting can be made controlling the deposition of rubber, etc. Further, the maintenance is simple, and the appearance of tyre is not damaged.

- (Dwg.1/13)

IW - TYRE MOULD HOLD PIECE CAN MOUNT FORM TREAD PATTERN ONE SLIT FORMING
AIR VENT

IKW - TYRE MOULD HOLD PIECE CAN MOUNT FORM TREAD PATTERN ONE SLIT FORMING
AIR VENT

NC - 001

OPD - 1997-03-24

ORD - 1998-10-06

PAW - (NIGA) NGK INSULATORS LTD

TI - Tyre mould - has holders on which pieces can be mounted to form tread pattern, with at least one slit for forming air vent.

A01 - [001] 018 ; H0124-R ; S9999 S1434 ;

- [002] 018 ; ND05 ; K9416 ; J9999 J2948 J2915 ; N9999 N7261 ;
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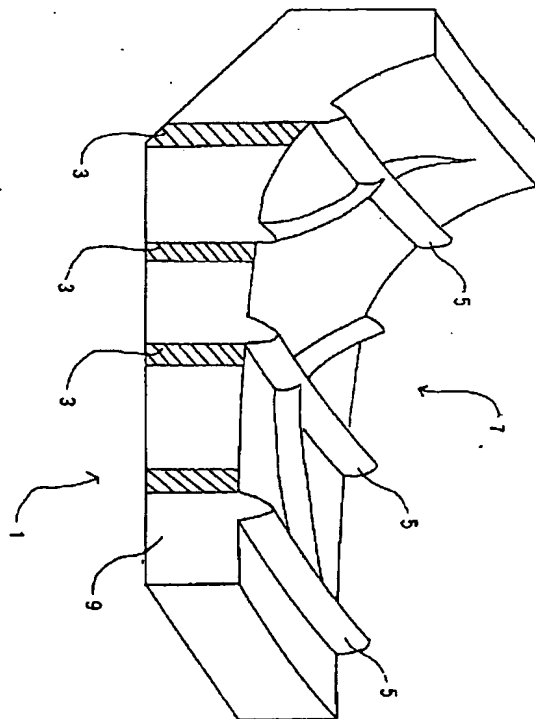
(74) 代理人 弁理士 綿貫 達雄 (外1名)

(54) 【発明の名称】 タイヤ成形用金型

(57) 【要約】

【課題】 ゴム等の汚れの堆積を低頻度に抑えつつ、効果的な空気抜きを行うことができ、メンテナンスが簡単に行え、更に、タイヤの外観を損なうことのないタイヤ成形用金型を提供する。

【解決手段】 製品タイヤにとレッドパターンを付与する、全体として環状をなす複数のピース1相互の隣接面の間に少なくとも一つの空気抜きのスリット3を備え、そのスリットの開口部の幅が10 μ m乃至200 μ mであり、そのスリットの開口部の長さが合計1mm以上である開口部から0.3ないし5.0mm進んだ点から、そのスリットの幅が大きくなるようにした。



【特許請求の範囲】

【請求項1】 製品タイヤにトレッドパターンを付与する、金型として環状をなす複数のピースと、これらピースを周方向に隣接して装着できるホルダとを備えたタイヤ成形用金型において、前記ピースは、トレッドパターンの一部を付与する成形面と、他の前記ピースと当接又は近接する隣接面と、前記ホルダと当接又は近接する背面とを有し、前記ピース相互の隣接面の間に少なくとも一つの空気抜きのスリットを備え、そのスリットの開口部の幅が $10\mu\text{m}$ 乃至 $200\mu\text{m}$ であり、そのスリットの開口部の長さの合計が 1mm 以上であることを特徴とするタイヤ成形用金型。

【請求項2】 前記スリットの開口部から 0.3 乃至 5.0mm 進んだ点から、そのスリットの幅が大きくなるようにした請求項1記載のタイヤ成形用金型。

【請求項3】 複数の前記スリットが、該スリットの開口部から 0.3 乃至 5.0mm 進んだ点で、互いに連通する請求項1または請求項2に記載のタイヤ成形用金型。

【請求項4】 前記スリットの内壁の面粗度が $R_{\text{max}} 10\mu\text{m}$ 以下である請求項1乃至請求項3のいずれかに記載のタイヤ成形用金型。

【請求項5】 前記スリットの内少なくとも1つのスリットの一端が凸部付け根端に形成されてなる請求項1乃至請求項4のいずれかに記載のタイヤ成形用金型。

【請求項6】 前記ピースが、鉄系合金又は銅系合金から成る請求項1乃至請求項5のいずれかに記載のタイヤ成形用金型。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、タイヤ成形用金型に係り、更には、連続成形性、メンテナンス性に優れ、高い寸法精度を有し外観の良好なタイヤを成形できるタイヤ成形用金型に関する。

【0002】

【従来の技術】従来のタイヤ成形用金型としては、図11に示すような上下分割形式の金型、及び図12に示すような径方向への分割形式の金型が知られており、このような金型においては、タイヤ加硫成形時に金型と未加硫ゴムとの間に封じ込められた空気等のガスを金型の外部に排出するために、ベントホールと称される、金型の内外に連通する小孔が多数穿設されていた。しかし、かかるベントホールを穿設する作業には熟練を要し、しかも穿設個数が多いため工数も多くなる結果、金型の製造効率が十分ではないという問題があった。また、ベントホールにより、成形されたタイヤ表面にスピューと称される毛状のゴムが発生するので、これを除去しなければならず、除去したとしてもタイヤ表面に痕跡が残存し易く、この痕跡がタイヤの外観を損なったり、タイヤの初期走行特性を損なうという問題があった。更に、上述の

如き金型を用いてタイヤの成形を繰り返すと、上記スピューが切断されてベントホール内に残存したり、ゴム分等の汚れが堆積することによりベントホールが詰まることがあり、その結果、空気抜き効果が低下し、タイヤ表面にアバタ状のベアと呼ばれる不具合が発生させる。この為、ベントホール内の異物を除去し、常に貫通状態にしておく必要がある。また金型表面はポリマーカーボン、その他の無機物質により汚れるため、金型を定期的に洗浄する必要がある、この洗浄後は全てのベントホールにつきドリル等を用いて手作業で異物のさらえを行わなければならない、金型のメンテナンスが煩雑であるという問題があった。

【0003】このような問題に対して、特開平4-223108号公報及び特開平5-220753号公報には、図12に示すようなセグメント形式のタイヤ成形用金型を用い、タイヤにトレッドパターンを付与するトレッド成形部13を複数のピース1に分割してホルダ15で保持し、型組の際に各ピース同士の隣接間隔を適切に制御して、ゴム分の排出を阻止すると同時に空気を抜く為の隙間を設けることにより、ベントホールの数を低減又は無くし得ることが開示されている。また、ピース1を分割して上記空気抜きの隙間を設けることは、図11に示すような金型にも適用可能であることも記載されている。しかしながら、上述のようなピースを分割して隣接配置する金型においても、通常のタイヤ成形用金型同様に、タイヤを数百〜数千回成形すると、金型表面が汚れ、得られるタイヤの外観が損なわれたり、ベントホール、ピース間の空気抜きの隙間にゴム等の汚れが堆積し、ベアが発生するために、金型を数百〜数千回成形毎に定期的に洗浄する必要がある。上記ピース分割金型において、空気抜きの隙間に入り込んだゴム分等の汚れを除去するこの洗浄は、各ピースをホルダからはずして、各ピースにガラスビーズ、鉄粉等の粉体を吹きつけるブラスト洗浄により行われる。図13は、タイヤ成形用金型の一例を部分的に示す斜視図である。同図には図13に示すようなセグメント形式の金型の一部分が示されており、複数のピース1はホルダ15に装着され、セグメント19を構成している。ピース1は、全部のピースでタイヤ全体のトレッドパターンを形成するもので、その成形面7にはタイヤにトレッドパターンを形成するための凸状パターン（骨部及びブレード部）が形成されている（図示せず。）。

【0004】

【発明が解決しようとする課題】ピースに分割して隣接配置する金型は、従来のタイヤ成形用金型に比べ、スピューの発生を防止できるとともに、スピュー切れによるベントホールの詰まりも防止できるようになったが、ピース間のゴム等の汚れの堆積は減らず、頻繁に各ピースをばらしてブラスト洗浄を行わなければならないという問題があった。本発明はかかる状況を背景としてなされ

【0008】図3はスリット開口部長さよりピースの背面側のスリット長さを大きくした実施の形態を示す斜視図である。スリット長さを大きくすることにより通気抵抗を下げるができる。スリットのスリット開口部の幅が20μmであり、そのスリットのスリット開口部の長さは5mmとし、スリットのスリット開口部から奥行き2.0mmの箇所からスリットのスリット長さを15mmとした。なお、図3に示すようにスリット長さを非連続(段付き)に大きくすること以外に、図4に示すようにスリット長さを連続的に大きくすることも可能である。奥行き寸法を0.3mmよりも小さくすると、はみ出しゴム高さがこれを越え、結果

的にゴム切れを起こし、切れたゴムがスリット内に残存し好ましくない。

【0009】図10(b)はスリット開口部の幅よりピースの背面側のスリットの幅を大きくした実施の形態を示す断面図である。スリット幅を大きくすることにより通気抵抗を下げることができる。なお、図10(a)はスリット開口部の幅が均一である場合の断面図である。

【0010】図5は複数のスリットを連結した実施の形態を示す斜視図である。スリットの開口部の幅が $20\mu\text{m}$ であり、そのスリットの開口部の長さは 5mm とし、スリットの開口部から奥行き 2.0mm の箇所でのスリットと連通させた。スリット間を連通させることにより、通気抵抗を下げ、空気溜まりが発生しやすい箇所の空気を効率よく排除できる。

【0011】図6および図7はスリット端と骨端部との位置関係を示す部分斜視図である。図6はスリットの一端が凸部付け根端に形成されてなるピースを示し、図7はスリットの一端が凸部付け根端よりやや中に入ったピースを示す。図7に示したピースの方が加工が容易である。従来、閉塞ブロック、特に骨付け根部に空気溜まりが発生しやすい傾向にあったが、本実施の形態のスリットを適用することにより、空気溜まりの発生を防ぐことが可能となる。

【0012】図8および図9は成形面からみたスリットの形成位置を示す図である。図8においては、隣接するピースの一方の隣接面に溝を形成することによりスリットの開口部を形成し、図9においては、隣接するピース双方に溝を形成することによりスリットの開口部を形成した。所定の開口部面積が確保できればいずれも選択することができる。図8の方が加工面が少なく好ましい。

【0013】なお、上記ピースの材料は、鉄系合金または銅系合金とした。また、スリットの加工は機械加工で行った。ただし、ブラスト、エッチング、放電加工等公知の技術を適宜適用することができる。

【0014】本発明ではスリットの表面粗度は $R_{\text{max}} 10\mu\text{m}$ とした。タイヤ成形を行い、堆積したゴム等の汚れの成分分析をした結果、従来の金型（表面粗さは一般に $20\sim 30\mu\text{m}$ ）から採取した汚れからはFe分が検出されたが、本発明の実施の形態例からはFe分は検出されなかった。面粗度を小さくすることにより、汚れが堆積しにくくなると共に、容易に汚れを除去することが

できることを示している。

【0015】

【発明の効果】以上の説明した通り、本発明によると、ゴム等の汚れの堆積を低頻度に抑えつつ、効果的な空気抜きを行うことができ、メンテナンスが簡単に行え、更に、タイヤの外観を損なうことのないため、本発明は極めて有益である。

【図面の簡単な説明】

【図1】ピースのスリットを示す斜視図である。

【図2】他の実施の形態におけるピースの斜視図である。

【図3】他の実施の形態におけるピースの斜視図である。

【図4】他の実施の形態におけるピースの斜視図である。

【図5】他の実施の形態におけるピースの斜視図である。

【図6】他の実施の形態におけるピースの部分斜視図である。

【図7】他の実施の形態におけるピースの部分斜視図である。

【図8】他の実施の形態におけるピースの平面図である。

【図9】他の実施の形態におけるピースの平面図である。

【図10】他の実施の形態におけるピースの断面図である。

【図11】従来のタイヤ成形用金型の一例を示す分解斜視図である。

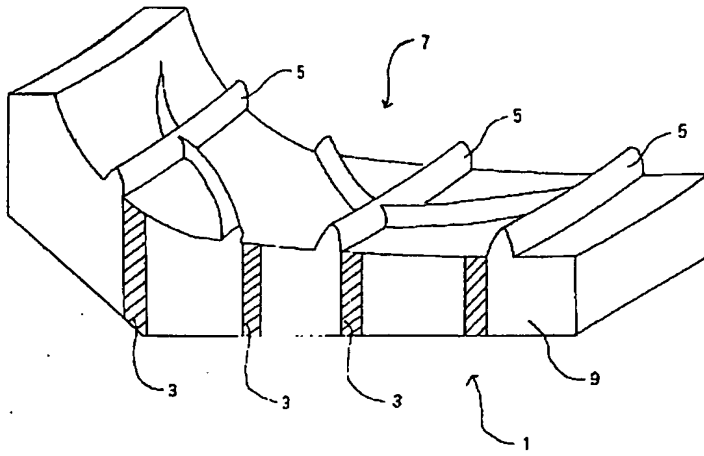
【図12】従来のタイヤ成形用金型の一例を示す分解斜視図である。

【図13】図12の一部を拡大した斜視図である。

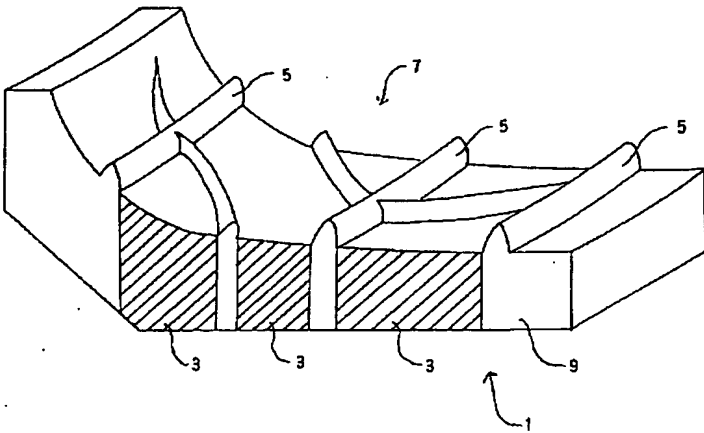
【符号の説明】

- 1 ピース
- 3 スリット
- 5 凸部
- 7 成形面
- 9 隣接面
- 11 背面
- 15 ホルダ
- 19 セグメント

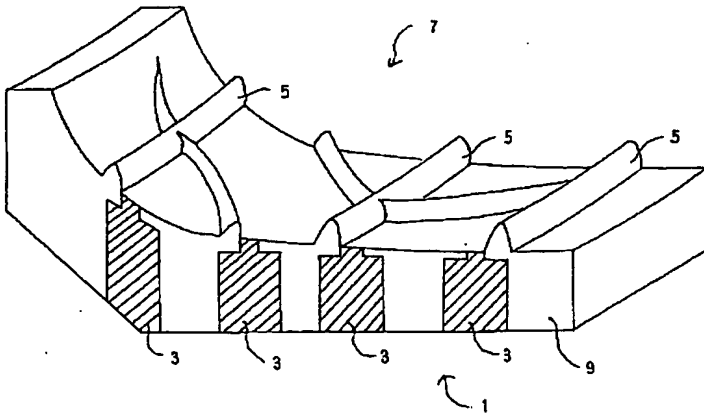
【図1】



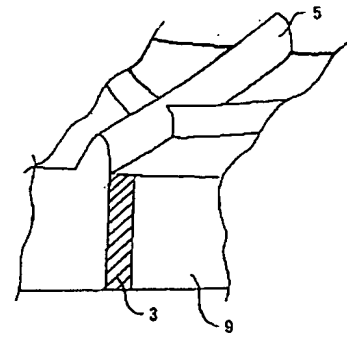
【図2】



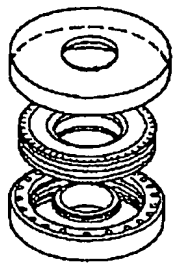
【図3】



【図6】

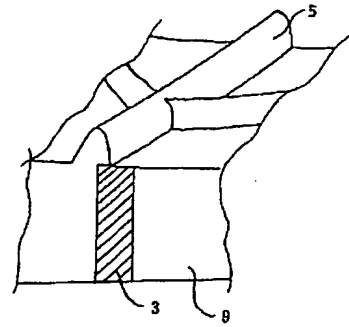


【図11】

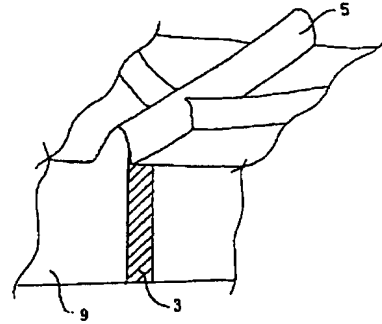


【図7】

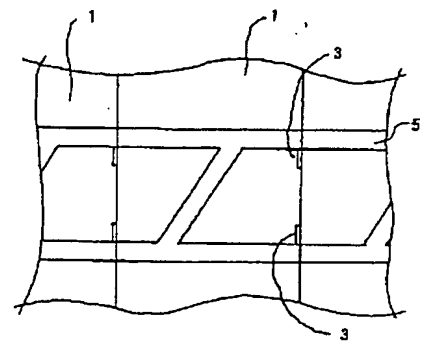
(a)



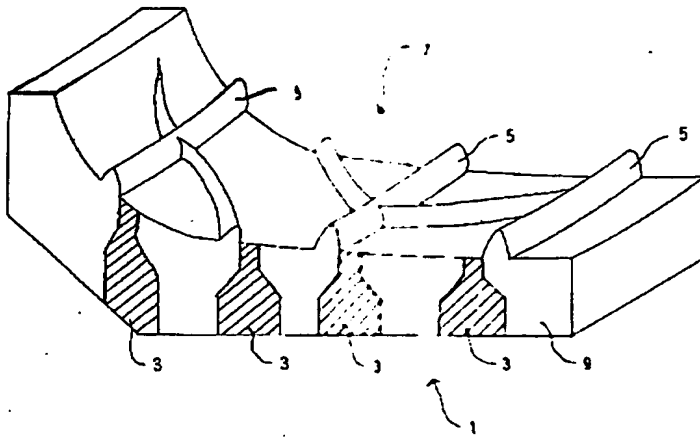
(b)



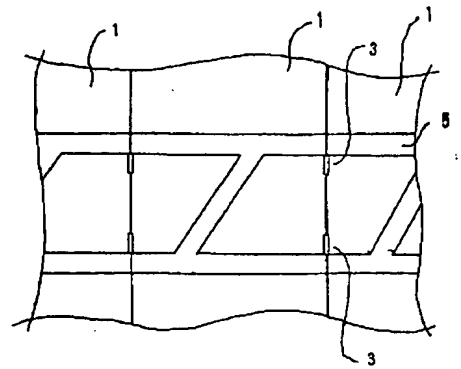
【図8】



【図4】



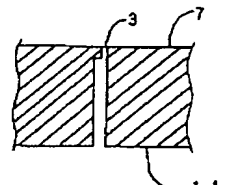
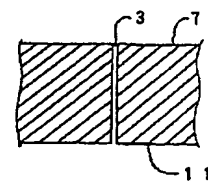
【図9】



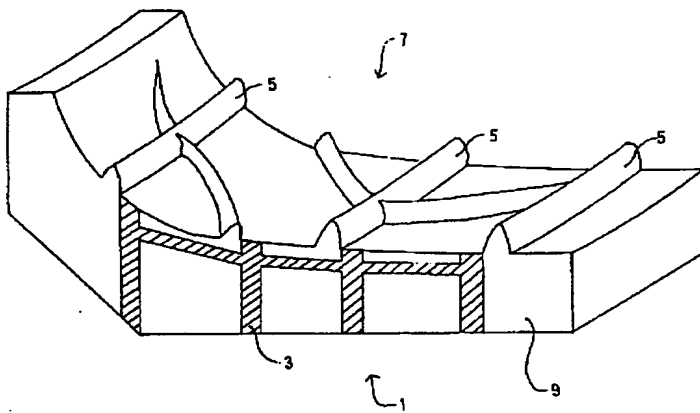
【図10】

(a)

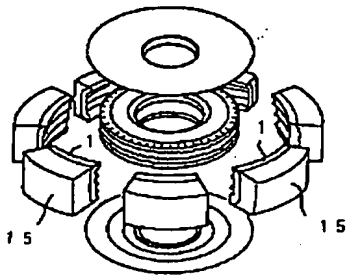
(b)



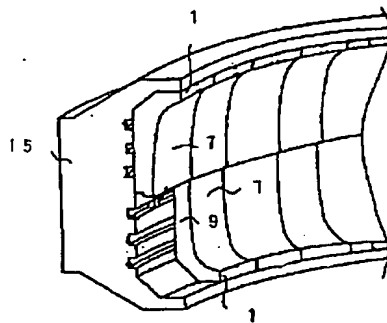
【図5】



【図12】



【図13】



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